The Computer as Music Critic

T HANKS to advances in comput- ing power, we can analyze mu- sic in a radically new and differ- ent way. Computer programs can now analyze entire collections of music that researchers have painstakingly transcribed, by poring over years of note data and performing unprecedented large- scale statistical analyses. What can we learn from this data? How do different musical works and composers compare with each other? Do we hear what we imagine? To find answers to these questions, we need to first understand what makes each music sample sound different. This is the field of music information retrieval (MIR), which is now widely accepted as the most relevant and recog- nized area of music research.

To understand this, consider a musical slice — in our case the musical beat, which is the most common way that composers partition their music into meaningful units. In this way, music can be regarded as a series of musical beats. What makes each music slice unique? What do we observe?

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For each slice, our computer repre- sented music with musical attributes such as the rate of change in the basic harmonic melody, which is the most fundamental aspect of the music. We then tried several other musical attributes, such as what the “color” of a note, or, measured the distance from the note to the next note in the same slice, and then measured the distance from the basic harmonic melody to the note. For each of the musical attributes, we calculated the energy of each note, and then the energy profile of the music slice.

Finally, we found that recording levels also play a role, and we conclude that a music slice is confirmed or scarred toward loud- ness.

What color do your ears bring to your music? What do you hear when you listen to your favorite music? What are the emotions you feel when you listen to your favorite music? How do these emotions change over time?

The trick, of course, is to determine what makes each music sample sound different. This is the field of music information retrieval (MIR), which is now widely accepted as the most relevant and recog- nized area of music research.

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